

WHAT IS CLAIMED IS:

1. A solid polymer electrolyte fuel cell comprising:
  - a) a polymer electrolyte membrane having proton-conductivity, and
  - b) an anode disposed on one surface of the polymer electrolyte membrane, and
  - c) a cathode disposed on another surface of the polymer electrolyte membrane, wherein the cathode comprises a first gas diffusion layer joined to a second gas diffusion layer in a thickness direction of the cathode, and wherein the second gas diffusion layer has a different characteristic as compared to the first gas diffusion layer.
2. The solid polymer electrolyte fuel cell according to claim 1, wherein the cathode further comprises a hydrophilic intermediate layer disposed between the first gas diffusion layer and the second gas diffusion layer of the cathode.
3. The solid polymer electrolyte fuel cell according to claim 1, wherein the first gas diffusion layer differs from the second gas diffusion layer in one of gas permeability in the thickness direction of the cathode, electric resistance and hydrophobicity.
4. The solid polymer electrolyte fuel cell according to claim 1, wherein the first gas diffusion layer is disposed at a catalyst layer side of the cathode, the second gas diffusion layer is disposed at a separator side of the cathode and the gas permeability of the second gas diffusion layer is larger than the gas permeability of the first gas diffusion layer.
5. The solid polymer electrolyte fuel cell according to claim 1, wherein at least one of the anode and the cathode is made by wet papermaking process.
6. The electrode comprising:
  - a first gas diffusion layer, and
  - a second gas diffusion layer joining the first gas diffusion layer in a thickness direction of the electrode, and wherein the second gas diffusion layer has a different characteristic compared to the first gas diffusion layer.
7. The electrode according to claim 6, further comprising a hydrophilic intermediate layer disposed between the first gas diffusion layer and the second gas diffusion layer of the electrode.
8. The electrode according to claim 6, wherein the first gas diffusion layer differs from the second gas diffusion layer in any one of gas permeability in the thickness direction of the electrode, electric resistance and hydrophobicity.
9. The electrode according to claim 6, wherein the gas permeability of the second gas

diffusion layer is larger than the gas permeability of the first gas diffusion layer.

10. A method for producing an electrode of a solid polymer electrolyte fuel cell comprising the steps of:

- (1) forming a plurality of second gas diffusion layers;
- (2) forming a first gas diffusion layer by pressing one of the second gas diffusion layers to increase a density of the second gas diffusion layer, and
- (3) thermally pressing to join the first gas diffusion layer and the second gas diffusion layer.